THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 46. NOVEMBER 11, 1944 VOL. 56.

The Reliability of Indirect Field Tests for the Diagnosis of Chronic Contagious Mastitis

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As a result of the very considerable financial loss due to the ravages of chronic contagious mastitis, the necessity for controlling this disease has long been recognised. Since it is believed that the disease is chiefly spread from cow to cow by milkers' hands and teat cups, it has been accepted that the most rational method of controlling the spread of the condition is by determining which of the animals are infected and milking such beasts after the "clean" animals have been milked and stripped. As long ago as the latter end of the 19th Century Nocard and Mollereau (1887) —who first described *Str. agalactiae*—succeeded in controlling an outbreak of the more acute form of this disease by such simple measures. Whilst this theory of control remains practically undisputed the major problem which has yet to be solved is that of finding a practical method of determining which are the infected beasts. Undoubtedly the most efficient method is one in which a sample of the milk from each cow is tested in a culture medium particularly suited to the specific requirements of the causal organism, *Str. agalactiae*, a streptococcus which falls into Lancefield's Group B.† Amongst such media Edwards' crystal-violet-aesculin blood agar has been very popular, but the trend now is towards the use of incubated milk samples. Unfortunately, when consideration is given to the milch cattle population of Great Britain—*circa* 2½ millions—it is apparent that even with enormously increased laboratory facilities, it would be impossible to test every such cow even twice in a year.

It was this factor that influenced the decision of the Survey Committee of the National Veterinary Medical Association (1941), who recommended veterinary practitioners to resort to certain indirect field tests for the diagnosis of chronic contagious mastitis. These indirect tests aim not at demonstrating the actual causal organism, but at observing certain phenomena which result from the presence of pathogenic streptococci in the udder. There are a number of such tests available, some of which can be completed in the field, whilst others require simple laboratory apparatus. The better known tests are:—

I. INDIRECT FIELD TESTS

(*a*) *Indicator Test.*—The principle of this test is that normal milk has a *p*H of approximately 6·5. The presence of *Str. agalactiae* in the udder tends to cause the *p*H to rise to a range of between 6·8 and 7·6.

Suitable indicators which cover a convenient range include brom-thymol-blue (much used in America and Germany) and brom-cresol-purple; the latter indicator is that most frequently used in this country. In aqueous solution this dye is orange, but when in contact with normal milk the colour turns a dove grey, whilst with mastitis a typical deep purple hue is produced. The test may be carried out in a number of ways. The simplest is to use filter paper which has been soaked in a saturated solution of the dye, dried, and then cut up into convenient strips; a little milk from each quarter is drawn on to a strip. Alternatively, a little milk may be drawn into a tube to which B.C.P. has been added. A number of commercial firms have adopted the test as a basis for ingenious devices which might attract the attention of the farmer.

(*b*) *Strip Cup.*—An infected quarter will sometimes yield, particularly in the first draw, a few flakes or clots (which would normally escape notice). By drawing this milk on to a dark background these flakes become apparent.

(*c*) *Palpation of the Udder.*—It is an accepted fact that in a percentage of infected cows changes occur in mammary parenchymatous and interstitial tissue. The picture is complicated, however, by the fact that cows exposed to infection with *Str. agalactiae* respond in different ways. The following four groups appear to exist:—

1. Animals may excrete *Str. agalactiae* from their udders for a number of years without showing any detectable changes whatsoever. These may be considered as true carriers.

2. Animals may excrete *Str. agalactiae* and show clinical changes in the udder which only become detectable after one, two or more years. American workers refer to this as infection with a low grade streptococcus.

3. Acute cases of mastitis not infrequently occur in which the causal organism can be shown to be ***Str. agalactiae.*** In these cases the tissue changes are rapid and marked atrophy may occur within a month.

4. Occasionally one encounters a cow which has been subjected to the danger of infection from its neighbours for a long period, sometimes extending for several years, yet it does not succumb to the disease. One may only assume that such an animal has a high degree of natural resistance.

It cannot be denied that the above observations could be explained on the ground that strains of ***Str. agalactiae*** may vary considerably in pathogenic power, but it is possible to find all four groups existing on the same farm under conditions which suggest that only one strain of the organism is involved.

All these facts have to be taken into account when a manual examination of udders is undertaken. Udall (1939) recommends examination to ascertain into which of a table of degrees of fibrosis the udder falls, and when this is taken into account with other indirect tests he attempts to diagnose the type of infection present. Hucker (1932) in a survey of a number of truly chronic cases, found that out of 172 infected cows only 7 per cent. did not show some abnormal fibrous tissue in one or more quarters.

The author finds the greatest difficulty in determining what constitutes a standard udder. When an examination is undertaken a rapid palpation of the quarters should first be carried out in order to assess the natural elasticity, etc., of the udder, after which a more detailed examination of each quarter is made. The depth of the quarter is palpated in a search for deep set induration; this is usually a sign of long standing infection. If a quarter is "hard" (*i.e.*, the quarter has some fibrous tissue present, but there is no unnatural lobulation) it may be taken as a sign of more recent infection. A "light" quarter is usually the result of an old case of mastitis in which atrophy has occurred.

All examinations should be made after milking, and whilst one hindquarter may be compared with the other hindquarter or one forequarter with the other forequarter, no such comparison should be made between fore- and hindquarters. In this connection it can be mentioned that the author has encountered a herd in which a bull sired a number of offspring each of which had a light off forequarter, although no mastitis was encountered in any of the animals in question.

II. INDIRECT LABORATORY TESTS

All indirect tests have the disadvantage that they do not demonstrate the specific organism. There are many such tests, those most commonly used being:—

(*a*) *Chlorine Test.*—Normal milk contains 0·09 to 0·14 per cent. chlorine. Anything above this is considered indicative of the fact that the milk was obtained from cows suffering from mastitis.

(*b*) *Leucocyte Count.*—This test was developed by Prescott and Breed (1910). There is no doubt that milk from infected cows yields a much higher leucocyte count than normal milk, but again the problem of deciding upon a standard presents itself.

(*c*) *Catalase Test.*—The amount of catalase in milk varies according to the number of tissue cells present. The number of leucocytes in mastitis milk is high and therefore such milk will contain an abnormal quantity of catalase.

(*d*) *Hotis Test.*—This test was evolved by Hotis and Miller (1936). It consists of adding 0·5 c.c. of 0·5 per cent. brom-cresol-purple to 9·5 c.c. of milk, and incubating for 24 to 28 hours. It has been modified by Murphy (1939) who describes 12 different types of reaction. Classes 2 and 7 refer to *Str. agalactiae* and these respectively are characterised by the production of a thick yellow deposit at the bottom of the tube, or the production of yellow colonies clinging to the side against a background of blue or yellow.

All the above tests have been used by various workers, but there

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†*Str. agalactiae* is also referred to in the literature as Mastitis Streptococcus Group I of Minett, Stableforth and Edwards.

has been a lack of unanimity regarding the individual value of each test. Literature on the subject is vast and it is only possible to cite a few references of particular value. The *p*H determination by colorimetric methods has been widely used. Udall and Johnson consider the test useful and Rosell (1931) also agrees with their finding. Stableforth (1930, 1935) and Hucker *et al.* (1932) point out that positive readings are on the whole reliable but that negative results *per se* should not be trusted. These findings are substantiated by Edwards (1934). Plastridge and Anderson (1933) found that while 70 per cent. of cows which occasionally yield abnormal milk were positive when tested with brom-cresol-purple solution, the test was of little value in true latent cases of infection. Little (1938) in the course of several thousand determinations of milk *p*H from eight experimental heifers, found that before infection 99·3 per cent. of samples had a *p*H of 6·7 or less and that once infection was established this figure had only been reduced to 81·4 per cent. These findings were supported by Fay *et al.* (1938) who carried out 7,000 tests with brom-thymol-blue, comparing them in this case with microscopic examination of the incubated milk samples. They concluded that this dye only detected 21·1 per cent. of infected quarters and gave false readings in 1·6 per cent. cases.

Lack of definite normal standards renders difficult the assessment of the value of the chlorine and leucocyte tests.

The Hotis test is spoken of highly by Udall (1939) who quotes Murphy's statement that of 753 samples examined by this method 95 per cent. of the results agreed with results obtained by culturing on blood agar. In the laboratory at Leeds we had carried out a small number (*circa* 200) of Hotis tests, and the results have not been very encouraging. Positive results are usually substantiated by confirmatory test, but negative results are of little value; false positives are rare.

It was because of this divergence of opinion that the author decided that figures accumulated at this Department might be of interest. The figures were not obtained during an *ad hoc* experiment. For a considerable time it has been the practice when examining milk samples to carry out where possible a strip cup test, followed by a manual examination of the cows in question. It has been found that from such an examination one is able, after having read the bacteriological tests, to give far more useful advice to the farmer than might otherwise be the case. Especially is this so at the commencement of a control scheme when a knowledge of the condition of the herd, milking routine, type of shed, etc., is invaluable. In this way, strip cup and clinical examination results became available from the examination of 598 cows, from which quarter milk samples were examined bacteriologically using Edwards' agar.

Later the brom-cresol-purple test was added. This was carried out by adding the dye to the tube. This was found to be an equally reliable method and had two great advantages over B.C.P. papers:—

i. Convenience, as standard conditions for all milks were obtainable.

ii. A test was carried out using B.C.P. papers in a shed in which the black-out arrangements were interfering with ventilation. Although the air was not apparently foul, sufficient ammonia was present in the air to turn the papers purple as soon as they were exposed. This indicated a possible source of false positives which had to be avoided.

The 598 cows came from herds in which the incidence of mastitis varied as shown in Table I.

Table I

Number of Herds	Incidence of Mastitis as Determined by Bacteriological Examination	Incidence of Clinical Mastitis
1	High	High
1	Low	Majority of infected cows clinical cases
3	High	Low
2	Low	Negligible

Amongst the cows examined were four with "summer mastitis," three harbouring *Str. uberis* and one harbouring *Str. dysgalactiae*. These cows have been omitted from the figures to avoid confusion. These eight cases were all of a clinical nature.

Table II and III cover the 598 cows of which 229 were harbouring *Str. agalaciae* in the udder. The number of quarters affected was 495.

Table II shows the number of cows which were picked out by the strip cup test or palpation of the udder or a combination of the two. The number of false results is also shown.

Table III summarises the results obtained when individual quarters were considered.

Table II

Strip Cup Test and Manual Examination of the Udders of 598 Cows, 229 of which were Positive when Tested by Edwards' Crystal Violet Aesculin Blood Agar. (Quarter samples tested)

Detected as Infected by	Positives agreeing with Edwards' Agar		False Positives	
	Number	Percentage of Known Positive Cows	Number	Percentage of Known Non-infected Cows
Strip cup only	29	12·6	3	0·8
Manual examination only ..	54	23·6	83	22·5
Both strip cup and manual examination	59	25·5	1	0·3
Cows picked out by either or both of the above ..	142	62·0	87	23·6

Table III

Strip Cup Test and Manual Examination of 2,392† Quarters, 495 of which were Known to be Positive to Edwards' Agar

Detected as Infected by	Positives Agreeing with Edwards' Agar		False Positives	
	Number	Percentage of Known Positives	Number	Percentage of Known Non-infected Quarters
Strip cup only	52	10·5	5	0·3
Manual examination only ..	98	19·8	135	7·2
Both strip cup and manual examination	100	20·2	4	0·2

† Not all the quarters of the 598 cows were functioning, but in all cases sufficient secretion could be obtained to carry out a bacteriological test.

One hundred and sixty-eight of the 598 cows were examined using B.C.P. and strip cup tests and manual examination, and 75 of these were shown to be infected when tested using Edwards' agar. 62 (82·6 per cent.) of the known infected cows were discovered by one or more of these tests, 13 (17·3 per cent.) were missed entirely, and of the 93 uninfected cows, 23 (24·7 per cent.) were falsely implicated. The figure 82·6 per cent. was in point of fact somewhat higher than it should have been because in eight cows (4·8 per cent.) an infected quarter was missed by all tests, whilst in some animals a false positive was obtained in another quarter. These cows were therefore rightfully condemned by fortunate coincidence. The more accurate criterion therefore is to use the figures obtained from testing individual quarters. These are as follows:—

No. of cows examined by B.C.P., strip cup and manual examination ... ... = 168
No. of infected quarters ... ... = 158
No. of quarters picked out by B.C.P. test only ... ... = 22
No. of quarters picked out by strip cup test only ... ... = 7
No. of quarters picked out by manual examination only ... = 9
No. of quarters picked out by B.C.P. and strip cup test ... = 14
No. of quarters picked out by B.C.P. and manual examination ... ... = 9
No. of quarters picked out by strip cup tests and manual examination ... ... = 8
No. of quarters picked out by all tests ... ... = 35
No. of quarters picked out by one or more tests ... ... = 104

These figures are summarised in Table IV.

Table IV

Strip Cup, B.C.P. and Manual Examination of 672 Quarters, 158 of which were shown by Edwards' Agar to be Infected

Detected by	Positives Agreeing with Edwards' Agar		False Positives	
	Number	Percentage of Known Positives	Number	Percentage of Known Non-infected Quarters
B.C.P.	80	50·6	36†	7·0
Strip cup	64	40·5	8†	1·5
Manual	61	38·6	36	7·0
Quarters picked out by any or all of the above tests ..	104	65·8	70	13·6

† Including three normal quarters going dry.

In addition, for interest, 158 cows from three different herds which were being tested by bulk samples (one sample per cow) by means of McKenzie's thallium-acetate-crystal-violet medium were examined under the following conditions:—

(*a*) B.C.P. solution was added to the milk sample in the usual proportions (1 c.c. per 20 c.c. of milk). It was found that the milks had to stand at room temperature for one hour in order to allow colour changes to develop; comparison with a standard was essential as the colour changes were not always well marked.

(*b*) The cows were tested by strip cup and manual examination and were noted as apparently clear or infected without reference to which quarters were affected. These 158 animals are considered separately and the figures obtained by bulk sampling and bulk field testing are summarised in Table V. They cover the 158 cows, 92 of which were shown when tested by McKenzie's technique to be infected in at least one quarter.

TABLE V

Strip Cup, B.C.P. and Clinical Examination of 158 Cows, in which Testing of Bulk Milk Samples by McKenzie's Thallium Acetate Technique had shown 92 Infected Udders

Detected by	Positives in Agreement with Thallium Acetate Broth Results	False Positives
B.C.P.	13	8
B.C.P. and strip cup	1	0
B.C.P. and strip cup and manual	10	0
B.C.P. and manual	22	0
Manual and strip cup	6	0
Manual alone	27	9
Strip cup alone	3	2
Total	82	19
Percentage	89	28·7

DISCUSSION

It will be seen in all these tables that whilst indirect tests individually applied demonstrate only a small proportion of infected cows, a combination of these methods produces a satisfactorily high figure. Unfortunately, the number of false positives is alarmingly high, so that grave doubts are cast on the value of indirect tests, *per se*, in determining the presence of chronic contagious mastitis. The largest source of error occurs during manual examination; it appears that individual variation of quarters is so great that even with wide experience it is impossible to differentiate correctly between an infected and a non-infected udder. In this respect, however, it would be advisable not to rule out altogether the assertion by certain American workers (*e.g.*, Broadhurst and her co-workers (1939), that mastitis is due to the presence of a filtrable virus. It may thus be possible that tissue changes occur in the udder even though *Str. agalactiae* is absent. In addition reference has been made recently in the American literature to non-specific mastitis in which tissue changes of a marked character occur even though no causal organism can be found. (Hastings and Beach (1937), Petersen *et. al.* (1938), Petersen and Hastings (1939) and Hastings and Petersen (1940)). There has recently been a trend to enrich milk samples by various methods, *e.g.*, incubation before

TABLE VI

Results of Repeated Strip Cup Examination of the Fore-milk of Infected Cows

Cow	Infected Quarters	4.3.1941	5.3.1941	6.3.1941	7.3.1941	9.3.1941	12.3.1941†	13.3.1941	14.4.1941
6	L.F.	Yellow clots	Yellow pus	—	Clots	—	Pus	White clots	White clots
	L.H.	—	—	Yellow clots	Clots	Pus	Pus	Pus	White clots
	R.F.	Yellow clots	Yellow and thin	Yellow clots	Clots	—	Pus	Yellow clots	Thin and clots
7	L.F.	Pus	Yellow	Yellow	Clots	—	Thin	Pus	White clots
	L.H.	Pus	Yellow	Yellow	Clots	—	—	Thin and clots	—
	R.F.	—	Yellow	Yellow	Thin	Clots	Clots	—	—
	R.H.	Pus	Yellow	Yellow	Clots	Clots	Clots	—	Thin
9	L.H.	—	Thin	Thin	—	—	—	Thin	—
13	L.H.	—	—	Clots	—	—	Thin	—	—
	R.F.	—	—	—	—	—	Thin	—	—
15	L.F.	—	—	—	—	—	Clots	Clots	Yellow clots
	L.H.	—	—	—	—	Clots	Thin and clots	Clots	Yellow clots
	R.F.	—	—	Suspicion of flakes	Slightly thin	—	—	—	—
16	L.H.	Thin and clear	Thin	Thin and slightly yellow	Thin	Thin	Thin and clots	—	—
	R.H.	Thin and clear	Slightly thin	Slightly thin and yellow	—	Thin	—	—	Slightly thin
24	L.F.	—	Pus	Clots	Clots	Clots	—	Slightly yellow pus	Clots
	L.H.	Yellow clots	Pus	Thin and yellow	Thin	—	—	Thin and yellow	Thin and clots
	R.F.	Yellow clots	Pus	Clots	Clots	Clots	—	Thin and yellow	Yellow pus
	R.H.	Yellow clots	Pus	Clots	Clots	Pus	Clots	Thin and yellow clots	Clots
32	R.H.	—	—	Thin	—	—	—	—	—
43	L.F.	—	—	—	Thin and slightly yellow	—	—	—	—
	R.F.	—	—	—	—	—	Pus	—	—
44	L.H.	—	—	—	—	—	—	Slightly thin	—
	R.H.	Clots	Clots	Thin and clots	—	Thin	—	Slightly thin	Thin
49	R.F.	—	Thin	Clots	—	—	—	—	—
50	L.H.	—	Thin	Slightly thin	—	—	—	—	—
	R.F.	—	—	—	Thin	Thin	—	Thin	Slightly thin
55	R.F.	Clots	—	—	—	—	—	—	—
61	L.F.	Thin	—	—	—	—	—	—	—
	L.H.	Thin	—	—	—	—	—	—	—
	R.F.	Flakes	—	—	—	—	—	—	—
	R.H.	Thin	—	—	—	—	—	—	—
66	L.H.	Clots	Clots	Thin, slightly yellow	—	—	Thin	Clots	Clots
68	R.H.	—	—	—	—	—	Clots	—	—
71	R.F.	Clots	—	—	—	—	—	Clots	Clots
	R.H.	—	—	Thin and yellow	—	—	—	—	—
80	R.F.	—	—	—	—	—	—	—	Clots
81	L.H.	Clots	—	Clots	—	Clots	—	—	—
	R.F.	Clots	Clots	Clots	Clots	Clots	—	—	Clots
84	L.H.	—	Clots	Clots	—	—	—	Clots	—
	R.F.	Clots	Clots	Clots	—	Clots	—	Clots	Clots
86	R.F.	—	—	—	Clots	Clots	Clots	Clots	Clots
	R.H.	—	—	Clots	Thin	—	—	—	Slightly thin
75	R.H.	Suspicio s	Thin	Thin	—	Thin	Thin	—	Slightly thin

† Carried out after milking.

testing for *Str. agalactiae*. There is no doubt that such pre-examination treatment increases the number of bacteriological positives and this again may account for some of the apparently false "positives." At the same time it may be doubted whether the infected udder of a cow which is tested at three months intervals and which escapes bacteriological detection due to the excreting of only small numbers of streptococci could undergo tissue changes of a sufficiently severe nature to allow such changes to be detected by manual examination.

The brom-cresol-purple test does not appear in a very good light, but again is a useful adjunct.

The strip cup gives by far the fewest false positive results, but unfortunately the test when applied at long intervals shows only a small percentage of infected quarters.

In an endeavour to find to what extent shorter period testing would demonstrate a greater number of positives, a herd of 34 cows, 29 of which were known to be infected, was tested by the strip cup each day for a week. The results showed that five infected cows gave no indication of infection, two were always positive, and the five non-infected cows were always negative; the remaining 22 cows, all of which were infected, were variable. See Table VI.

It will be seen that the strip cup test carried out on any one day shows a fraction only of the animals which it will reveal if used regularly. This indicates that this test should be carried out consistently by the herdsman himself; unfortunately experience has shown that such a practice is all too rare. This is a great mistake, particularly in herds where machine milking is in operation, for in such herds cases of acute clinical mastitis may otherwise be missed. The strip cup is a very useful aid to the combating of mastitis because it helps the farmer to realise that his cows really are infected—all too often bacteriological reports do not impress him sufficiently. The strip cup should, however, be used by the most senior member of the staff present at milking time.

Summary and Conclusions

1. The results of applying the strip cup and manual examination tests to 598 cows, 229 of which had been shown, when tested by Edwards' agar, to harbour *Str. agalactiae*, are presented.

2. Figures obtained by applying the brom-cresol-purple test (in addition to the strip cup and manual examination test) to 168 cows, of which 75 had been shown, when tested by Edwards' agar, to be harbouring *Str. agalactiae*, are also given.

3. A similar series of figures are given which were obtained by comparing results of field tests with those obtained by testing bulk samples by McKenzie's thallium acetate medium.

It is concluded that when the indirect field tests are applied to determine which cows are infected with *Str. agalactiae* a combination of brom-cresol-purple, strip cup and manual examination reveals a high percentage of the infected animals. This finding is in accordance with that of other workers. Unfortunately a large number of uninfected beasts (*ad* 40 per cent.) are incriminated. Moreover, the value of the indirect tests is further limited by the fact that these infected cows are not detected and the inclusion of even a small percentage of the heavily infected animals amongst apparently clean cows would seriously impair the efficiency of control measures.

There is an urgent need for an accurate, yet simple, laboratory test for the diagnosis of mastitic milk which would enable a comparatively small number of laboratories in the country to deal with the majority of the milch cow population of Great Britain. A liquid medium requiring no confirmatory tests would seem to be the ideal. Such a medium would have to be capable of giving satisfactory results with milk samples up to 24 hours old.

Acknowledgments.—The author's thanks are due to the Agricultural Research Council for a grant that covered the expenses of the work, to Dr. A. W. Stableforth for supplies of Group B serum and to Dr. A. W. Stableforth and Mr. S. L. Hignett for their advice in the preparation of this paper.

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Some Observations on Helminths in Scottish Hill Sheep

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Introduction

In view of the general interest aroused by the publication of the Reports of the Committees on Hill Sheep Farming, it was thought that the following data might be of value in that they reveal the incidence of helminths in the hill flocks of one area of Scotland.

The report of the Scottish committee on hill sheep contains frequent reference to the prevalence of stomach and intestinal worms and to fluke infestation in this type of stock; but, apart from the somewhat indefinite reports of farmers, there appear to be few statistical data available to indicate the prevalence of helminths, particularly of stomach and intestinal worms. Indeed, one would hardly expect a questionnaire submitted to farmers to reveal much of value on the prevalence of parasites which often undermine the health of sheep without causing spectacular clinical symptoms. To obtain further reliable information it is clear that a more direct study of the problem is required, over a number of years and at a number of typical localities.

The relative reliability of modern techniques for counting helminth eggs affords a means whereby statistical data on the prevalence of these parasites may be obtained.

It was with this end in view that a start was made in 1940 and 1941 on the hill farms of Ettrick Valley, Selkirkshire, and although, owing to the difficulties of travelling, the survey was limited to one short period of the year and is therefore incomplete, it was thought that the publication of the results might be of value at the present time.

Description of Farms

The farms where these studies were made are typical hill farms carrying Blackface and Cheviot sheep and have little in the way of enclosed pastures, although some variation was seen in this regard. The possible influence of this on the incidence of helminths is discussed later in the paper.

Methods

Observations were carried out during July and August and, in 1940, were confined to six "hefts" from five farms. As it was impossible to examine all the animals in each "heft" in the time available, it was decided to make a study of a cross-section comprising roughly one-third of the sheep. Accordingly faeces were taken from each and an egg-count made. The age of each animal was recorded in order that the incidence of infestation in each age-group could be determined.

The method adopted for egg-counting was a modification of the Gordon-Whitlock technique. All nematode eggs were counted and a note made of the presence of tapeworm eggs. The technique employed does not lend itself to the demonstration of fluke eggs, but in numerous examinations made by other techniques during the survey, no fluke eggs were seen in the faeces of sheep in this district, nor were adult flukes seen at *post-mortem* examinations, although the snail intermediary is known to be present.

The observations made in 1941 took in two other farms as well as new "hefts" of the farms studied in 1940. One of the new farms was in Upper Eskdale where the results were similar to those obtained in the Ettrick Valley.

Results

In all, 719 sheep and lambs were examined and the results are set out in the following table (Table I). The table is arranged as a series of egg-count groups, each group covering a range of 500 eggs per gramme of faeces. For each egg-count group, the number of animals falling within that group is shown, expressed as a percentage of the total examined in each age.

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Table I
Percentage of Sheep in Each Egg-count Group

Age Groups	Egg-count Groups				
	0–500	500–1,000	1,000–1,500	1,500–2,000	2,000 and Over
Lambs	51·4	27·0	14·2	6·0	1·4
1 year	55·0	15·3	8·2	8·2	13·3
2 years	61·0	25·6	8·5	1·2	3·7
3 „	77·3	10·7	3·6	1·2	1·2
4 „	74·7	13·2	6·6	2·2	3·3
5 „	68·2	16·5	7·0	2·4	5·9
6 „	77·9	10·7	3·1	1·5	0·8
All groups combined	65·8	19·2	7·6	3·5	3·9

The table shows that by far the larger proportion of the sheep and lambs fall within the lowest egg-count group and the numbers in each successive group rapidly decline until the 2,000 e.p.g. and over group is reached. This trend is not, however, so well marked in the younger sheep, a fact in accord with prevalent theories that resistance to helminths increases with age. This point is brought out when lambs and hoggs are grouped together and compared with older sheep :—

Percentage of lambs and hoggs with over 500 e.p.g. .. 47·1
Percentage of other ages with over 500 e.p.g. .. .. 27·1
And again :—
Percentage of lambs and hoggs with over 1,000 e.p.g. .. 24·8
Percentage of other ages with over 1,000 e.p.g. .. 9·7

Table I shows further that there are rather more hoggs than lambs in the higher egg-count groups. This, perhaps, may be unexpected, but at the time of the survey the lambs were still running with their mothers and had not experienced any setback due to weaning.

With regard to the two-year-olds, while few show high egg-counts, fully one-fourth fall into the 500 to 1,000 egg-count group. As most of these had lambed in the spring, it is tentatively suggested that while the majority have built up a satisfactory resistance to helminths, the strain of lambing has interfered with the resistance mechanism of the remainder.

The older sheep, of ages three to six years, are more or less closely comparable as regards egg-counts, although the five-year-olds show some slight variation.

Table II shows the incidence of Moniezia spp. in the various ages. The figures support the well-known contention that these tapeworms occur chiefly in young animals but that older sheep may also sometimes harbour the parasites.

Table II
Percentage of Sheep with Moniezia

	Age Groups						
	Lambs	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years
Percentage infested	43·9	7·1	3·7	8·3	5·5	1·2	6·1

Discussion

Nearly 4 per cent. of all the animals examined had egg-counts of 2,000 e.p.g. or over, and most of these were in obviously poor condition. It is clear that there must be certain areas on the hills where concentration of faeces produces enough infective larvae to allow of the building up of heavy infestations amongst the animals which habitually graze there; and some sheep are known to be in the habit of breaking into the enclosed pastures around the farm houses. These fields are heavily stocked from time to time and may also be used for the wintering of hoggs, so that faecal contamination is probably intense and the fields dangerous from the aspect of helminthiasis.

Opportunity was taken to carry out a few *post-mortem* examinations of sheep and lambs. The results showed that the dominant species of worm in the district is *Ostertagia circumcincta*, followed by *Trichostrongylus vitrinus* and *T. axei*, and by *Chabertia ovina*. The larger stomach worm, *Haemonchus contortus*, although present, was never seen in large numbers and this worm does not seem to be of great importance in the district.

The relative scarcity of *H. contortus* has a direct bearing on the significance of the egg-counts obtained; for in the absence of this worm, which is a very prolific egg layer, an egg-count of 1,500 e.p.g. or over is generally considered to indicate an infestation of clinical importance.

It is difficult to determine at what level of worm infestation symptoms of disease appear, and how lesser infestations may interfere with thriftiness. It is possible that in hill sheep, where *H. contortus* is negligible, an infestation giving a count of 1,000 eggs per gramme or even less might have an effect far greater than would be found in lowland sheep where a higher level of nutrition obtains. Assuming some such ratio to be pathogenic, then it is clear that a considerable danger exists, since nearly 25 per cent. of the lambs and hoggs come within this category. Indeed, this proportion may be far lower than would be found in other districts, because on the farms included in the survey it has been the practice for a number of years to dose extensively, chiefly with copper sulphate and nicotine.

It is not suggested that the figures set out above give a complete picture of the prevalence of helminth infestation in Scottish hill sheep. But they indicate that even where the intensity of the stocking is as low as one sheep to four or five acres it cannot be assumed that helminths are of little or no importance. Concentrations of sheep on small areas in the hills are frequently higher than obtain on lowland fields, and when allied with severe weather conditions and low nutrition helminthiasis may occur in a considerable proportion of animals, particularly in the lambs and hoggs.

Acknowledgment.—The authors wish to express their grateful thanks to Mr. Andrew Linton, of Gilmanscleuch, Ettrick, without whose interest and co-operation the work could not have been carried out.

CLINICAL COMMUNICATION

A Natural Case of Tuberculosis in a Guinea-Pig

E. COTCHIN
Royal Veterinary College

Spontaneous tuberculosis in guinea-pigs, despite their high susceptibility, is rare, and as most of the records in the literature are concerned with the spread of tuberculosis from experimentally infected animals to those kept in the same room, the following case not occurring under such conditions is thought worthy of description.

In April of this year, a London woman keeping guinea-pigs as pets brought one of them to the Beaumont Animal Hospital of the Royal Veterinary College for examination. She had kept guinea-pigs successfully during the past four years, but had lost eleven through disease since the beginning of this year. They showed a sudden onset of wasting, and lost their appetite; death followed in a week or so. *Post-mortem* examination of the sick guinea-pig showed extensive tuberculous lesions in the lungs and in the greatly enlarged liver and spleen. The lymph node in the anterior mediastinum was greatly swollen and full of greenish-yellow soft caseous material. The lymph nodes in the axillary and cervical regions were tuberculous, but no lesions were seen in the inguinal or mesenteric lymph nodes.

The lesions in this case might suggest that infection was aerogenous, possibly acquired from one of the other sick guinea-pigs, and not directly from food, as it is possible, but not proven, that the other deaths were due to tuberculosis. The source of infection was not found, but a bovine strain of tubercle bacillus was recovered from the guinea-pig. Since the owner instituted rigorous disinfection measures, no further deaths have occurred.

MODERN VETERINARY-MEDICAL INSTITUTE INAUGURATED IN STOCKHOLM

A new Veterinary-Medical Institute was recently inaugurated in Stockholm. This institute, which is described by the Stockholm papers as a milestone in veterinary-medical research work in the country, is situated in the northern outskirts of Stockholm. The institute comprises three sections: a pathological, a bacteriological and a serological section, which are supplemented by a chemical and a parasitic laboratory. Altogether it employs about 150 persons.

The institute has cost about 5,000,000 kroner (£300,000) and the State pays an annual subsidy of 900,000 kr. (£53,000) towards the running costs.

The veterinary-medical service in Sweden was already well organised. Through the new institution increased possibilities have been provided, however, for an effective combating of the diseases of the domestic animals, which still cause heavy losses. In the years 1938-1940, for instance, foot-and-mouth disease involved losses of 22,000,000 kr. (£1,300,000), while tuberculosis and infectious abortion caused losses of 60,000,000 kr. (£3,530,000).

* * * * *

Weekly Wisdom

As to the lack of administrative experience among men of science, which is considered a serious obstacle, it seems to me that if a classical education is looked upon as a sound foundation for the conduct of the affairs of the native populations of Africa, then a knowledge of the quantum theory should be as good equipment for the administration of civilised communities.—M. J. Dunbar. *Nature.* Oct. 11th.

ABSTRACTS

[Phenothiazine in Cattle Practice. Britton, J. W. (1944.) *Vet. Med.* **39**. 239-242.]

Britton describes parasitic gastritis as it occurs in calves in California and separates the disease into three forms:—

Primary parasitic gastritis, in calves and steers being fattened on lush clover pastures, with gradual onset and course with the typical symptoms of parasitism such as anaemia, diarrhoea, submaxillary oedema, rough coat and emaciation.

Secondary parasitic gastritis seen as a complication of malnutrition, generally in yearlings in the autumn, with rapid course and onset. In some cases cattle die within two weeks after showing rapid emaciation and terminal diarrhoea. The rapid course has on occasion led to an erroneous diagnosis of haemorrhagic septicaemia. Usually, it is found that the ranges have dried up except for small areas of green feed around water holes, springs and creek beds where the cattle rapidly gather massive infections which, together with the inadequate feed available, account for the acute syndrome.

Mixed parasitism seen largely in dairy calves and combining several other disease factors together with parasitic gastro-enteritis, namely, lungworms, lice, malnutrition and calf pneumonia. In all forms of parasitic gastro-enteritis found in California *Ostertagia ostertagi* and *Trichostrongylus axei* are the principal parasites involved.

Three outbreaks of primary parasitic gastritis were treated successfully with phenothiazine with doses of 12 grammes for calves up to 30 grammes for yearlings. One of the outbreaks had been treated several times unsuccessfully with the copper sulphate-nicotine sulphate mixture.

Five outbreaks of secondary parasitic gastritis were also treated with phenothiazine with successful results, although three of the outbreaks had been treated with the copper-nicotine mixture. The cattle affected were yearlings and the dose given was from 30 to 50 grammes of phenothiazine.

Four outbreaks of complicated parasitism were available for treatment and of 100 head treated only four calves failed to recover (all were heavy lungworm infections with secondary pneumonia) whilst of 20 left untreated only five survived.

Britton used smaller doses than previous workers and was satisfied with 15 grammes for calves and 30 grammes for yearlings. The drug was administered for convenience in capsules; a tightly filled half-ounce capsule held 12 grammes and sufficed for calves, whilst ounce and one ounce and a half capsules holding 25 and 40 grammes sufficed for yearlings and older cattle respectively.

Administration of phenothiazine in salt (1 : 10) was not so successful in cattle as in sheep, as inadequate amounts were consumed.

J. S. S.

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[Survival on Grass Plots of Eggs and Larvae of the Stomach Worm *Haemonchus contortus*. Shorb, D. A. (1944.) *J. Agric. Res.* **68**. 317.]

Reviewing the literature on this subject, the author quotes the following survival times of the infective larvae of *Haemonchus contortus* as they were determined by the authors named:—

Ransom. Three months during the winter, the larvae having been frozen for about one-third of the time. Infested pastures will not become free from infestation when they are left ungrazed from October 25th to June 16th under climatic conditions similar to those of Washington, D.C. If, however, they are kept free of ruminants for a year, they are practically free of infestation. Drying and freezing affects the larvae of this nematode species comparatively little.

Veglia. In South Africa Veglia found that these larvae could not withstand the natural climate and that often all were dead after less than one day, if they were not protected by shade or subjected to rainfall.

Mönnig. In South Africa these larvae died in less than three months in dry weather.

Dikmans and Andrews. In the United States lambs became infested with *H. contortus* and other species in the spring on pastures unoccupied during the winter.

Boughton and Hardy. In the United States larvae of *H. contortus* survived for 22 months on pastures, but after 31 months infested pastures did not infest lambs.

Griffiths. These larvae do not survive from October to May on Montreal Island, Canada.

Swales confirmed this and found that, in eastern Canada, the larvae do not survive from the autumn (August to November) till the following June.

Baker, at Ithaca, N.Y., found that worm-free lambs were infested with *H. contortus* and other nematodes on a pasture 12 months after heavily infested sheep had grazed it till the grass was eaten down to the crown and 21 months later this pasture infested two lambs.

Shorb used experimental grass plots four foot square, subdivided into two plots two foot square with a sandy loam soil, sown with grasses and clovers, which were cut once a week to keep the grass at a height of four inches. The cuttings were left on the plots. Faeces of sheep infested with *H. contortus* were put at the centre of each subplot and the plots were examined at intervals of one or more weeks by cutting the grass and washing the larvae off it. A Baermann apparatus recovered larvae from the faeces and from the soil to a depth of one inch. The weather data are given.

The author concludes from his four experiments conducted from August, 1936, to March, 1938, at Beltsville, Md., that, during the autumn and winter, many fewer larvae were recovered from the experimental plots than in the summer and early autumn (fall). The number of larvae recovered in March was higher than in February, probably because rising temperature attracted the larvae to the soil surface. A few larvae exposed on grass plots in August or October survived till the following spring, but all the surviving larvae were sluggish, vacuolated and probably not infective. Shorb concludes that pastures kept free of sheep from October till the middle of April will contain only a few infective larvae which are viable.

G. L.

* * * * *

[Histopathology of Enzoötic Bovine Haematuria. Plummer, P. J. G. (1944.) *Canad. J. comp. Med.* **8**. 153-158.]

This condition is endemic in certain areas in British Columbia, where it causes considerable economic loss. Plummer describes the histopathology of the lesions in the bladder: no lesions were found in the kidneys. The early lesions consist of discrete petechial haemorrhages and ecchymoses. At a later stage there are large irregular haemorrhagic areas measuring several centimetres in diameter. These sometimes become converted into pedunculated growths which project into the lumen of the bladder and may reach three centimetres in length.

The early lesions show mild inflammatory changes in the bladder mucosa, consisting of haemorrhage, oedema and lymphocytic infiltration. Haemorrhage is a constant feature and in some cases extends throughout the whole thickness of the mucosa. At a later stage vascular channels appear in the haemorrhagic areas and haemangiomata are formed which may form cauliflower-like growths. Clinical haematuria does not occur until the angiomatous stage has developed and appears to be due to rupture of these extremely vascular growths: during the interval between cessation of haemorrhage and subsequent recurrence at some other site the haematuria disappears and the animal improves in condition.

The angiomata are of two types: 1. Capillary or cavernous angiomata with thin-walled vessels supported by a connective tissue stroma. 2. Growths in which endothelial proliferation produces thick-walled vessels which invade the surrounding stroma and infiltrate the epithelial and muscle coats.

E. G. W.

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[The Isolation of *Salmonella anatum* from the Faeces of a Dog. Craige, J. E. (1944.) *J. Amer. vet. med. Ass.* **105**. 33.]

S. anatum is most commonly associated with "keel" disease of ducklings, but it has been discovered in a wide variety of sites in various animals and the human. The author of this article records the cultural isolation of this organism, in large numbers, from the faeces of one or two Shetland sheep dogs. These showed symptoms of diarrhoea, inappetence, hypersensitivity, inco-ordination, partial paralysis of the hind quarters, blindness and fits of running and barking. Faecal material in one instance was very foetid. Six days of symptomatic treatment had no effect but sulphaguanidine brought about marked improvement in three days with subsequent complete recovery. This was given in 7 gramme doses, three times a day for three days, and in 5 gramme doses for four days.

Craige does not claim that *S. anatum* was the actual or only cause of the symptoms, but considers that (1) its recovery in large numbers from one stool (that of the other was not examined), (2) the fact that this organism is sensitive to sulphaguanidine, (3) that mental derangement in the dogs resembled that reported in humans associated with the recovery of *S. anatum* from the meninges, is strong presumptive evidence.

The author considers that there is need for further bacteriological study of the stools of dogs suffering from diarrhoea, especially when associated with symptoms similar to those recorded.

N. S. B.

The average production of the 26,000,000 American dairy cows is about 4,700 pounds of milk per cow a year; that of 800,000 cows under the Dairy Herd Improvement Association, 8 000 pounds. The world's record production for one cow is 41,943 pounds in one year.—*Vet. med.*

REPORT

[Northern Rhodesia: Report of Veterinary Department for 1943.]

Mr. J. H. N. Hobday, O.B.E., M.R.C.V.S., formerly of Bechuanaland Protectorate, is now Director of Veterinary Services, Northern Rhodesia, and this, his first annual report, is a brief account of the livestock position as he found it.

The livestock population of the Colony is a small one compared with that of some of the other colonies, but the veterinary field opens up wide possibilities for improving its quantity as well as its quality. Despite a relatively large European settlement, the great majority of animals are owned by natives whose methods still appear to be primitive and not conducive to good husbandry. Disease as well as bad management is claiming an undue toll in the economy of livestock farming and it will be interesting to see how the young and energetic new Director rectifies this.

The principal or menacing diseases in the Colony are bovine pleuro-pneumonia and trypanosomiasis. A scheme for controlling the former by widespread vaccination is already under way. Incidentally it was found that the protection given by Kabete vaccine was short-lived, vaccinated animals becoming susceptible to natural infection within 12 months of inoculation. The incidence of trypanosomiasis is increasing and as in other countries where tsetse flies exist the control of these vectors presents a major problem involving repercussions of considerable magnitude not alone in the livestock sphere but in the whole social and material welfare of the community.

Following on the lines of policy adopted in other colonies in recent years a start was made with the education of natives in veterinary science. A curriculum of instruction has been drawn up and applied to selected Africans who will subsequently take their place with existing veterinary personnel in the field. The present staff of European veterinarians and stock inspectors appears to be quite inadequate to deal with the position as it now stands, and even if these were greatly augmented they would still be incapable of undertaking the onerous duties that lie ahead in the matters of wholesale inoculations and the close supervision that will be required.

W. K.

QUESTIONS IN PARLIAMENT

Kenya (Rinderpest)

Captain Duncan asked the Secretary of State for the Colonies how many outbreaks of rinderpest have occurred in Kenya during the last 12 months; and what steps are being taken by the Kenya Government to control the disease and prevent its spread to Tanganyika and the Rhodesias.

Colonel Stanley: The latest information available covers the year 1943. There were no fresh outbreaks of epizoötic proportions in Kenya during the year. In the settled areas 13 outbreaks were confirmed, of which eight were attributable to contact with infected game. Most of the outbreaks were suppressed by inoculations and mortality was light. In the native areas eight outbreaks, with a low incidence of infection, were reported in reserves where an almost complete cover was obtained in the 1942 mass inoculations. In other reserves where for various reasons—shortage of staff, unfavourable weather conditions or the attitude of native stock owners—mass inoculations could not be undertaken, the incidence of infection remained high. At the end of the year there was, from Lake Victoria to the Coast, practically a continuous belt of immune cattle varying considerably in depth but almost everywhere extending to the railway line. The Directors of the Veterinary Departments in Kenya and Tanganyika work in close collaboration in the control of rinderpest, and at a conference held in Tanganyika early this year plans were made for simultaneous inoculation of cattle on the Tanganyika side of the border and of the natural calf increase on the Kenya side.

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Foot-and-Mouth Disease

Mr. Turton asked the Minister of Agriculture how many cases of foot-and-mouth disease have occurred in this country between January 1st, 1944, and October 28th, 1944, inclusive; and how many of these cases were in the county of Yorkshire.

Mr. Hudson: The figures are 126 and 63, respectively.

Mr. Turton asked the Minister of Agriculture how many cases of foot-and-mouth disease in this country between January 1st, 1944, and October 28th, 1944, originated in pigs; and how many occurred on butchers' premises.

Mr. Hudson: The figures are 59 and 15, respectively.

Mr. Turton: Will the Minister tell the House what steps he is taking to prevent infection occurring on butchers' premises?

Mr. Hudson: I am afraid that that would involve a rather long answer.

. . . . .

National Health Service

Sir Leonard Lyle asked the Minister of Health what progress is being made in his discussions with the medical profession about the establishment of a National Health Service; and by what date he anticipates that he will be in a position to evolve definite legislative proposals for submission to Parliament.

Mr. Willink: I would first refer my hon. Friend to the reply which I gave to my hon. Friend the Member for Reading (Dr. Howitt) on July 13th last. Since then, the representative meeting of the British Medical Association, to which I referred in that reply, has been arranged for early next month. Meanwhile, the Council of the Association have agreed to my suggestion that they should send representatives to elucidate points in their own draft statement of policy, and useful discussions for this purpose have taken, and are taking, place. I am not yet in a position to say when legislation will be introduced.

Sir L. Lyle: Can my right hon. and learned Friend give an assurance to the House and the country that the medical profession will not be cajoled or compelled to join the Civil Service?

Mr. Willink: I do not propose to cajole or compel the medical profession in that or in any other direction.

"SKIAGRAM"

Mr. W. McAdam Eccles writes in *The British Medical Journal* of October 28th: "Has not the time come when an effort should be made—and internationally—for a standard term to be used for the photogram produced by X-rays? To some this would appear to be long overdue, and it would redound to the credit of the English-speaking peoples if they were the nations to bring this about.

"At the present time—1944—there are no fewer than 19 words which have been used in connection with 'a negative produced upon a film sensitive to the action of X-rays.' Chronologically they may be tabled thus:—

1. X-ray
2. X-rays
3. X-ray picture
4. X-ray photograph
5. X-ray plate
6. X-ray film
7. Röntgen photograph
8. Roentgenogram
9. Actinograph
10. Actinogram
11. Radiograph
12. Radiogram
13. Sciagraph
14. Sciagram
15. Shadowgraph
16. Shadowgram
17. Skiogram
18. Skiagraph
19. Skiagram

"Much confusion and uncertainty are caused by such a variety of terms. Some very absurd expressions are still in common use, such as, 'Take an X-ray of this fractured bone'; 'Has a radiogram been made?' and so on. In reviewing what should be considered as the best—and international—word, it may be said that two terms stand out—namely, skiagram and X-ray film. Of these two almost certainly the first—skiagram—would appear to be the better. This word is etymologically sound, for its origin is from two Greek words, 'skia' a shadow, and 'gramma' writing. The following are the cogent reasons for its use from now onwards as the only word to designate the results upon a film sensitive to the action of X-rays:—

(*a*) It applies a 'shadow writing,' which is a negative produced by X-rays.

(*b*) It has never been used for any other purpose, nor is it likely to be used, if it were to become 'standardised' and that internationally.

(*c*) It has a distinctly 'scientific sound' about it, and has for years now been used 'scientifically.'

(*d*) Once standardised, it would become used in all scientific text-books, in reports upon patients, in courts of law, etc.

"The following are possible reasons for not using the term 'X-ray film': (*a*) It is somewhat cumbersome. (*b*) The term X-ray thus applied is unscientific. (*c*) The term 'film' is used in several senses: (1) a sensitised material upon which a negative is produced; (2) a common term for a 'movie' or 'stop-film' strip, upon which prints have been produced for exhibition; (3) a 'moisture on glass,' a 'haze,' and a 'thin membrane.'"

* * * * *

According to the U.S. Department of Agriculture, mineral oil when ingested prevents the absorption of two fat-soluble vitamins, A and D, and two important minerals, calcium and phosphorus. Prolonged use of mineral oil may lead to deficiencies. In experiences at the Arizona station rats taking mineral oil required three times as much cod-liver oil to supply the vitamin D required as did rats not given the oil. Puppies fed mineral oil could not use the calcium and phosphorus in their food to build a normal skeleton.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Nov. 16th.—Meeting of the South-Eastern Division, N.V.M.A., at Tonbridge (Rugby Football Club), 2.30 p.m.

Nov. 25th.—Annual General Meeting of the Society of Women Veterinary Surgeons, in London (69, Great Peter Street, S.W.1), 2.15 p.m.

Nov. 29th.—Meeting of the Royal Counties Division, N.V.M.A. at Reading (The University), 2.30 p.m.

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PERSONAL

Appointment.—Mr. John Norval, M.R.C.V.S., senior assistant veterinary inspector in the Public Health Department of the Corporation of Edinburgh, has been appointed to the post of veterinary inspector. The Public Health Committee have expressed their appreciation of the manner in which Mr. Norval has carried out the duties since the retirement of Mr. Arthur Gofton on July 15th.

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Births.—Ross.—On October 31st, 1944, at King's College Hospital, to Isabel, wife of K. A. Ross, M.R.C.V.S., of Eltham, a daughter (Jane Esther).

Taylor.—At "Pattentees," Danbury, Essex, on November 3rd, 1944, to Kathleen, wife of Ian S. M. Taylor, B.Sc., M.R.C.V.S.—a son.

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Marriage.—Grafton—Lochead.—On October 25th, 1944, at Nairobi, Kenya, Edgar Noel Grafton to Mary Elizabeth Lochead, M.R.C.V.S.

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R.C.V.S. OBITUARY

Catmur, Barry Gunn, The Vineyard, Abingdon, Berks. Graduated Glasgow, December 11th, 1931. Died in a nursing home in Oxford, following an operation, November 1st, 1944.

Harle, Geo. A. Moffat, Sunnyside House, Coldstream, Berwick. Graduated Edinburgh, April 15th, 1887. Died October 22nd, 1944.

Barry Gunn Catmur

A Tribute

Mr. H. Ivor Field, M.R.C.V.S., writes:—

As one who had the privilege of working with the late Barry Gunn Catmur I cannot let his untimely death pass without a word of appreciation of his qualities.

Firstly, let it be said that, above all things, he had a high sense of responsibility to his country, his profession and the public. That he could, in addition to running a busy practice, find time to be an enthusiastic member of the Home Guard and later an officer in the Cadet Force, speaks volumes for his sense of public duty. To him his profession was his pride. He loved his work and was ever mindful to maintain the dignity of the profession. Though not seeking the limelight, he was nevertheless a keen and critical observer of all that concerned its welfare. Generous to a degree, he was entirely happy in his home life. Knowing him, one cannot doubt but that his devotion to his work was a contributory factor in his untimely death.

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DUBLIN COLLEGE PRIZEWINNERS

The following were among the awards made at the Annual Prize Distribution at the Veterinary College, Ballsbridge, Dublin:—

Final Year.—G. F. Dancey—Silver Medals, Medicine, Surgery and Clinique; Bronze Medal, Meat Inspection. R. A. Gilmore—Bronze, Medicine and Surgery; Silver, Clinique. P. J. McCarroll—Bronze, Obstetrics.

Fourth Year.—A. H. Hamilton—Silver, Pathology and Parasitology. B. T. Farrelly—Bronze, do.

Third Year.—E. O'Sullivan—Silver, Anatomy. P. J. Daly—Bronze, do. M. J. McDermott—Silver, Materia Medica. T. Murphy (Dublin)—Bronze, do., and Bronze, Hygiene. T. Murphy (Palatine)—Silver, Hygiene.

Second Year.—W. J. Prendergast—Silver, Physiology and Anatomy; Bronze, Histology. H. Martin—Bronze, Physiology. J. A. Devereux—Bronze, Anatomy.

First Year.—Miss S. Ni Mhaoileoin—Bronze, Chemistry (Practical), Chemistry and Biology. D. Loughlin—Silver, Chemistry and Biology (Bursary).

Special Awards.—Metta Memorial—B. T. Farrelly. Kehoe Memorial—A. H. Hamilton. V.M.A.I. Silver Medal—D. L. Kelly.

Animal Management.—P. J. O'Connor, Silver; D. J. O'Gorman, do.

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SOCIAL INSURANCE BILL INTRODUCED

In the House of Commons on Friday of last week, Mr. Attlee formally introduced the Ministry of Social Insurance Bill, which is the first of the measures to give legislative effect to the new social insurance scheme, to which the House gave its approval on that day.

The Bill provides for the appointment of a Minister of Social Insurance (the office for which Sir William Jowitt has been designated) at a salary of £5,000 a year, and a Parliamentary Secretary at a salary of £1,500 a year. It also provides for the transfer to the new Minister of responsibility for existing social services.

The responsibilities to be transferred, with some slight exceptions, are: The functions of the Minister of Health and the Secretary of State for Scotland with respect to national health insurance, old-age pensions, widows', orphans', and old-age contributory pensions, and supplementary pensions; the functions of the Minister of Labour and National Service with respect to unemployment insurance and unemployment assistance; and the functions of the Home Secretary with respect to workmen's compensation.

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EDITORSHIP OF "THE LANCET"

The proprietors of *The Lancet* have announced with much regret that Dr. Egbert Morland is retiring from the staff, which he joined in 1915. He became Editor in 1937, and has done sterling work in maintaining the world-wide high reputation of the oldest medical journal in this country. He is succeeded by Dr. T. F. Fox, who will be the seventh editor since the periodical was first published in 1823. Dr. F. Clayton-Jones will be the Assistant Editor.

[Egbert Morland inherited from his predecessor, Squire Sprigge, a high standard in medical journalism. His own distinctive service has been to make *The Lancet* a forum for the discussion of the social aspects of medicine and the future of the profession in a society of rapidly changing structure. Before the war encouragement was given to a group of young medical planners and many valuable articles have been published on the Medical White Paper and the Beveridge Report. Dr. T. Fortescue Fox joined the staff of *The Lancet* in 1925 and has been assistant editor since 1937. He is 44 years of age and has served for three years in the R.A.M.C.]

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SPREAD OF MASTITIS AT MARKETS

At a recent meeting of the East Sussex F.U., Mr. J. R. Roberts reported that at a meeting of the Headquarters Milk and Dairy Produce Committee attended by him one of the outstanding matters discussed was the spread of mastitis, caused by bringing infected cattle into markets, and the measures proposed to deal with it. It was very strongly felt, he said, that the strongest possible steps should be taken to prevent such cattle from entering markets and that if any were allowed in they should not be handled except under proper supervision, adequate precautions being taken to see that disinfection was thoroughly carried out.

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FOOT-AND-MOUTH DISEASE: THE FIFE OUTBREAK

When reports arising out of the recent foot-and-mouth disease outbreak in the county were discussed by Fife local authority, it was revealed that during the outbreak an application was received to remove a carcase from the affected area to the free area, and the provisions of the Order restricting movement were such that they could not insist on any restriction being imposed on the movement of the carcase. It was agreed that the Department of Agriculture be approached in an endeavour to have the same limitation of movement imposed on carcases as on live animals.

The source of infection in the outbreak had been swill which had been collected from camps or docks, and the county clerk said a deputation from the County Councils' Association was to meet the Department to try to enforce the sterilising of all such swill before it left the premises. The authority endorsed this action.

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Over the week-end the existence of foot-and-mouth disease was confirmed among pigs at Billingborough, Sleaford, Lincs.

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"THE POLICY AND EXPANSION OF OUR DAIRY FARMING"

In the course of his address on the above subject at the November meeting of the Farmers' Club, Mr. J. L. Davies, Milk Production Officer, Ministry of Agriculture, said that the way had been prepared for the industry in the recent statement by the Minister of Agriculture in which he spoke of the need

for still more milk to be produced in the next few years, in order that consumers should be free of restriction of supplies as soon as possible. The increased annual output of milk suggested by the Minister was 350 million gallons for the United Kingdom, an increase of nearly 25 per cent. on present deliveries, which represents an increase of about 100 gallons for each dairy cow in the national herd. Following the announcement of this policy, suggestions had been made for this tremendous increase to be achieved, if possible, within the four-year programme to which the Government was committed. This was a firm basis for expansion of dairy farming and the high target set by the Minister involved by far the most rapid growth in the history of dairy farming in this country. The Government on this occasion had provided a foundation upon which they could build. He referred first and foremost, of course, to the guarantee for milk prices over the next four years.

The expansion of the liquid milk market was the basis upon which they asked for expansion of dairy farming in this country. He believed that the much-expanded war-time milk market would remain, for while he admitted that there was a large element of faith in his estimate of the future for milk, it was based on the generally recognised fact that milk was our finest food product, and that the people of this country were increasingly appreciating its value in the diet. Their experience during the war years would, in his opinion, help to expand the milk market permanently, and if they could not as dairy farmers expand this market for a product which at all times, in peace and war, was priority No. 1 of the nutritionists and health authorities, they would have only themselves to blame. It was, however, essential that the market be cultivated carefully and that the supplies offered to the public were clean, healthy and safe.

Proceeding on these lines, their first problem was to improve the yields of our herds. The Minister of Agriculture had already launched his campaign for livestock improvement on a national scale, and they were aiming to get an increase of 100 gallons per dairy cow. The means for achieving this objective were well known and were constantly being discussed. They must realise, however, that the problem was one of the biggest and most important that dairy farmers had faced: it was essentially a long-term problem in which the farmers would require every assistance and encouragement from their own organisations and from the Government. It must be clear to all that if they planned a big extension in milk output without increasing the size of herds, then there must be more concentration, both of interest and of effort, on the part of our dairy farmers in the breeding and management of dairy cows. Not that all farms from which milk was sold should specialise, nor that every dairy farm should carry the highest milk-yielding breed of dairy cows: their task in breeding was to make our national dairy herd a better dairy type, with considerably better performance, and to get results. The dairy farmers who bred their own cattle must show a high intensity of interest in the subject and pursue it. This would give the industry more specialists and more skilled milk producers.

An important step had been taken recently in the extension of milk recording, with the Ministry of Agriculture and the Milk Marketing Board co-operating with the farmers. This was only just the beginning and all could foresee the possibilities ahead, not only in increasing numbers of farmers recording, but particularly in the use of milk records for improved breeding purposes.

Now that the Board had undertaken the responsibility for developing artificial insemination on a national basis, it was to be hoped that milk records, and particularly progeny records, would be the scientific foundation upon which improved breeding practices would be applied in the great majority of our herds. Only a large-scale plan, which reached in its scope the thousands of dairy farmers, could bring important results quickly. We could not afford to wait. It was hoped that the analysis of National Milk Records in a Central Department would provide eventually a service of information to Breed Societies and breeders which would be of real value, linking closely pedigree and performance.

There was need for great extension of scientific investigation and research into the many problems of dairy farming in this country. We must now, surely, plan this having regard to the size, importance and need of the industry. He felt there was general agreement in this matter, agreement that only by scientific investigation carried out on a big scale at four, or even six, centres could there be provided the basis for their policy of expansion with rapid progress in productivity and efficiency. They need not argue the case for this: action was being taken already by the establishment of the National Advisory Service. His hope was that behind this service there would be established the necessary Bureaux of Investigation for Dairy Husbandry.

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FUTURE OF DAIRYING EDUCATION

"I am frightened at the future of the dairy industry unless something is done about the supply of trained research workers," said Professor H. D. Kay, Director of the National Institute for Research in Dairying, Reading, and President of the Society of Dairy Technology, at the Society's annual meeting. The Society has issued a report on the future of dairying education, and recommends that this should be directed into three nationally uniform and recognised channels. These, it says, should be a degree in dairying; two diplomas in dairying; and part-time instruction for a City and Guilds Technological Certificate. The Society adds, "There is an urgent necessity for the provision of at least one dairy technological institute of adequate size and scope to act as a national centre for advanced dairy education, particularly applied to the distribution and manufacturing industries, and possibly to act as a testing station for dairy machinery."

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BIGGER BREED SOCIETIES

"Pedigree breeders have increased enormously since the war," writes "Blythe" in *The Farmer and Stock-Breeder*. "I have been surprised to find that in three breed societies alone there are something like 12,000 members. There are 4,600 in the British Friesian Society, which now ranks as the largest, between 4,350 and 4,400 in the Shorthorn Society and 3,000 in the National Pig Breeders' Association.

"Years ago it was the Shire Horse Society that had the largest membership. I believe that in the 1920's it rose to about 6,000. Mechanisation has reduced the membership to about 3,600, but Shire breeders are as enthusiastic as ever.

"Here are four breed societies with a combined membership of 15,000, and reserve funds of probably £120,000. They have obviously the power to influence breeding in the right direction if they combined to spread the gospel of pedigree."

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Donegal County Committee made a strong recommendation to the Department of Agriculture to originate a system of registration to frustrate "the growing and ruinous practice of selling in-calf heifers as maidens for export to Great Britain."

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

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ABORTION VACCINES

Sir,—In view of the recent resolution of the R.A.S.E. concerning the use of vaccine 1 on all non-pregnant cattle, it might be of interest to record our experiences.

While Dr. McEwen was at Wye, we had 35 herds involving close on 1,000 cattle in his abortion control experiment using the Wye vaccine 45/20. Our results, checked by periodic blood tests, were consistently good.

When vaccine 1 was introduced, we began using it on a few adult cattle. Within a very short time we had in each of three herds a cow, which, after injection, became acutely ill with a marked falling off in milk yield, which did not return to normal for the rest of the lactation.

In view of these cases, the use of vaccine 1 in adult cattle was discontinued and our practice became the use of No. 1 on calves and No. 2 on adults, again with consistently good results. Recently, in view of the R.A.S.E.'s resolution, and certain rumours regarding vaccine 2, I vaccinated four Friesian cows, which had calved from a week to three weeks previously, with No. 1 vaccine. In 24 hours three of the four showed temperatures of 105° with marked malaise. The milk yield was very fortunately but little reduced. Under heavy sulphonamide treatment, the temperatures of two returned to normal within 24 hours and the third in 48 hours.

In view of these experiences, it would appear that the use of strain 19 in adult cattle is not without danger to the cow, and certainly not without anxiety for the practitioner, who, in spite of any resolution of the R.A.S.E., is the person held responsible by the client for any mishap. It would also seem that the A.R.C. are guilty of an indiscretion in advising the R.A.S.E. on the use of this vaccine without pointing out the possible dangers of its use.

Yours faithfully,

Neuadd, Llandilo, Carmarthenshire. F. V. John.

October 30th, 1944.

SIX-DAY CHICK DISEASE

Sir,—I am rather surprised at the title of this excellent research article by Messrs. Temperton and Bythell: I think, after all their investigations, they might at any rate have suggested an alternative title more in keeping with the conclusions they found than the loose cognomen "six-day disease." The only evidence for this title is that many chicks die on or about the sixth day, but the acute observer should notice symptoms of lack of appetite, etc., a day or two before this. Personally I think it is largely due to lack of vitamins in the diet and anaemia. One of the most frequent external symptoms noticeable is anaemia of the legs and a curly condition of the toes. Yeast as a remedy has been proved very beneficial in several cases, but it is more successful where chicks are intensively reared than when roaming about with a broody hen, and farms are not so good as chick houses.

Following is the diet of a well-known breeder and rearer of chicks which has been well tested and seldom fails. He gives four feeds a day and to 2 lb. of *good* balancer meal adds half a teaspoonful of salt and four teaspoonfuls of ground chalk, with six teaspoonfuls of cod-liver oil and eight teaspoonfuls of dried yeast (crushed yeast tablets may be used). The mash should be moist but not so wet that it sticks to the chicks' beaks. Fresh, clean, short grass should also be given. For a chick from hatching to laying just over 26 lb. of food is needed:—

First week a chick eats approx. 1·6 oz.
Second week 3·2 oz.
Third week 4·6 oz.
Fourth week 6·4 oz.

Amounting to 1 lb. for the first month, and at the sixth month 7·5 lb.

Yours faithfully,

Bolton. G. Mayall.

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HIGHER STATUS FOR THE VETERINARY PROFESSION

Sir,—Concerning the recent discussions about veterinary surgeons and unqualified practice, I would suggest that if the status of veterinary surgeons was raised in the public mind, it would go a long way towards a solution of the problem. People going to "dispensaries" and unqualified practitioners see someone in a white coat and firmly believe that they are going to the right place, and that they are getting the best attention for their animals. On many occasions I have had people come into my surgery after they have had their animals treated unsuccessfully for some weeks, and when they are informed that they have not had qualified attention, they are at once dismayed and amazed and say they did not know.

Our profession is not brought to the notice of the public sufficiently. Most people do not even realise that their health, too, depends on the veterinary surgeon to a large extent by his clinical inspections and tuberculin testing of dairy herds, meat inspections and administrative work in the control of notifiable diseases.

Everyone knows what a doctor does, but how many people know what a veterinary surgeon has to do? To obtain his degree he has to attend a course as long and as expensive as that of a doctor. Some people say, "Oh, my son/daughter would like to be a vet.: he/she simply adores animals and can do anything with them," as if that is the only qualification they need to be a veterinary surgeon. People must be made to realise that we use the same drugs and the same care and skill in surgery as our allied medical profession.

I think I am right in saying that every profession but ours has been represented on the B.B.C. Brains Trust. Speaking of broadcasts, a short while ago people were asked to send their messages early in the day to the doctors, but no mention was made of the veterinary surgeons who often have to travel much greater distances.

I am proud of my profession and it annoys me to think that the majority of people are so ignorant of the nature of our work.

No wonder people go to the "dispensaries" when they see photographs in reliable daily papers of eminent people patronising their hospitals, as I did recently.

Yours faithfully,

1, Marsh Street, Walsall. W. B. Brownie.
October 30th, 1944.

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THE ABBREVIATION "VET."

Sir,—I note the emergence of that hardy annual "Vet." in your correspondence columns. Perhaps the law-officer writing of "Vet." had in mind the Prime Minister's heartfelt request to the Civil Service for brevity.

Certain things the citizen will not have thrust upon him, and one is the pedantic insistence on "correct" nomenclature. Dickens, I think it was, once spoke of the horrors of correct pronunciation, and that master of English, Mr. Churchill, in a momentous speech utilised the freely accepted abbreviation "pub."

"Vet." has been in too long and general use to be supplanted unless some bright person can coin a striking substitute.

I have read that Scotchmen prefer to be called Scotsmen. Intimate acquaintance with Scotch broth and whisky has begotten the designation of their inventors by a like adjective; and why not? So beloved have "Vet." and Scotch become that they have entered the language also as verbs.

"Veterinary" is far too difficult. One hears it pronounced with three, four or five syllables, and it invites slurring; I have heard even a B.B.C. announcer flounder at it.

If we parade our objection unduly we may, in keeping with a modern tendency, have some terrifying synthetic designation thrust upon us. In N. America, for instance, the funeral undertaker is called a mortician, and likes it.

"Neo-Vet." would rather stagger us. Thus far we have escaped "She-Vet." For the "Animal Practitioners" it was proposed to licence, "Quasi-Vet." or "Semi-Vet." might serve: though I suspect that plain "Vet." or "Vetinary" would continue to be the general public's appellation for qualified and unqualified alike.

Let us add lustre to the old word.

"A rose by any other name."

Yours faithfully,

Long Planting, N. F. Pollock.
West Runton, Cromer, Norfolk.
October 30th, 1944.

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Sir,—I have read with considerable amusement the various letters discussing the use of the word "Vet." From my press cuttings I see that some time back in a well-known newsprint a member of the profession suggested that the abbreviation "Vet." be generally adopted in place of the words "veterinary surgeon."

The present discussion is interesting, but has no bearing at all on the real interests of the profession; yet some matters such as the one I mention below are passed by without a single line in our professional paper.

A farmer showed me a bill for 18s. from an unqualified man—the son of a late veterinary surgeon, whose practice he has now taken over—for testing a cow for tuberculosis with tuberculin. The carcase of the cow only fetched £1.

Surely the question of how these men get tuberculin for this purpose is as interesting as discussions on the use of an abbreviation of a word, which we all know will never be stopped.

Yours faithfully,

Woodcote Pound Hill, Crawley. Malcolm Park.
October 28th, 1944.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange*	Sheep Scab	Swine Fever
Oct. 1st to 15th, 1944...	11	14	—	6	107
Corresponding period in—					
1943 ...	13	—	—	11	19
1942 ...	10	29	—	7	23
1941 ...	12	1	1	3	17
Total Jan. 1st to Oct. 15, 1944	149	97	7	86	1,101
Corresponding period in—					
1943 ...	231	15	6	126	420
1942 ...	262	531	26	138	373
1941 ...	343	259	16	154	984

Note.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.

Tuberculosis Order of 1938

The number of bovine animals slaughtered under the Tuberculosis Order of 1938 during the period July 1st to September 30th, 1944, was 2,574.